

CLAIMS

We claim:

- 1 1. A system for synchronizing playback of media content with other content or with host
2 computer time information, the system comprising:
3 a web browser for providing a timing representation to a media player;
4 a media player implementing a first interface for object management and a second interface for
5 exchanging timing and synchronization information with the web browser; and
6 a player-hosting peer within the web browser for negotiating a playback state and a rendering
7 status between the browser and the media player.
- 1 2. The system of claim 1 wherein the player-hosting peer issues commands to the media
2 player.
- 1 3. The system of claim 2 wherein the media player notifies the player-hosting peer of
2 media player state changes.
- 1 4. The system of claim 1 wherein the second interface includes a playback state and a
2 current playback time passed from the media player to the web browser.

1 5. The system of claim 4 wherein the player and the player-hosting peer jointly maintain
2 the playing state and the current playback time.

1 6. The system of claim 1 wherein the second interface includes web browser time
2 information and/or application time information passed from the browser to the media player.

1 7. The system as in claim 1 wherein the player-hosting peer transitions through states
2 including inactive, active, waiting for data, and out of sync.

1 8. The system as in claim 7 wherein the player-hosting peer transitions from the inactive
2 state to the active state upon receiving a media cued notification from the media player.

1 9. The system as in claim 8 wherein the player-hosting peer transitions from the active
2 state to the inactive state upon receiving a deactivate command from the browser.

1 10. The system as in claim 8 wherein the player-hosting peer transitions from the active
2 state to the inactive state upon receiving a change source command from the browser.

1 11. The system as in claim 8 wherein the player-hosting peer transitions from the active
2 state to the waiting for data state upon receiving a buffer empty notification from the media player.

1 12. The system as in claim 11 wherein the player-hosting peer transitions from the waiting
2 for data state to the active state upon receiving a buffer full notification from the media player.

1 13. The system as in claim 11 wherein the player-hosting peer transitions from the waiting
2 for data state to the active state upon receiving a seek command from the browser.

1 14. The system as in claim 8 wherein the player-hosting peer transitions from the active
2 state to the out of sync state upon detecting a sync lost condition.

1 15. The system as in claim 14 wherein the player-hosting peer transitions from the out of
2 sync state to the active state upon detecting a sync recovered condition.

1 16. The system as in claim 14 wherein the player-hosting peer transitions from the out of
2 sync state to the active state upon receiving a seek command from the browser.

1 17. The system as in claim 1 wherein the media player transitions through states including
2 no source, playing, seeking, and media done.

1 18. The system as in claim 17 wherein the media player transitions from the no source
2 state to the playing state upon completion of media cueing.

1 19. The system as in claim 18 wherein the media player transitions from the playing state
2 to the no source state upon receiving a change source command from the player-hosting peer.

1 20. The system as in claim 18 wherein the media player transitions from the playing state
2 to the seeking state upon receiving a seek command from the player-hosting peer.

1 21. The system as in claim 20 wherein the media player transitions from the seeking state
2 to the playing state upon completion of a seek operation.

1 22. The system as in claim 18 wherein the media player transitions from the playing state
2 to the media done state upon receiving a stop command from the player-hosting peer.

1 23. The system as in claim 22 wherein the media player transitions from the media done
2 state to the playing state upon receiving a start command from the player-hosting peer.

1 24. The system as in claim 18 wherein the media player transitions from the playing state
2 to the media done state upon finishing media playback.

1 25. The system as in claim 24 wherein the media player transitions from the media done
2 state to the playing state upon receiving a start command from the player-hosting peer.

1 26. The system as in claim 1 wherein the media player notifies the player-hosting peer
2 when media is ready for playback.

1 27. The system as in claim 1 wherein the media player prepares for destruction upon
2 receiving a deactivate command from the player-hosting peer.

1 28. The system as in claim 1 wherein the media player changes from a first media source
2 to a second media source upon receiving a change media source command from the player-hosting
3 peer.

1 29. The system as in claim 1 wherein the media player notifies the player-hosting peer of a
2 buffer empty condition when media playback can not continue due to a media delivery problem.

1 30. The system as in claim 29 wherein the media player notifies the player-hosting peer of
2 a buffer full condition when the media delivery problem has been resolved and media playback can
3 continue.

1 31. The system as in claim 1 wherein the player-hosting peer notifies the player that the
2 media playback time is out of sync with time information maintained by the player-hosting peer.

1 32. The system as in claim 31 wherein the player-hosting peer notifies the player that
2 synchronization has been regained between the media playback time and time information maintained
3 by the player-hosting peer.

1 33. The system as in claim 1 wherein the player-hosting peer passes commands from the
2 browser to the player, the commands including play, stop, pause, resume, and seek.

1 34. The system as in claim 1 wherein the player-hosting peer passes a seek command from
2 the browser to the player to indicate that the player should jump to a specific time offset into media
3 playback.

1 35. The system as in claim 1 wherein the web browser is operating in a television set top
2 environment.

1 36. The system as in claim 1 wherein the other content includes advertising or other
2 commercial content synchronized with at least one portion of the media content.

1 37. The system as in claim 1 further comprising a proxy layer for passing synchronization
2 information or commands or both synchronization information and commands between the browser
3 and an external media player.

1 38. The system as in claim 1 wherein the player-hosting peer implements an interface for
2 providing access to timing information from the player-hosting peer.

1 39. A method of synchronizing playback of media content with other content or with host
2 computer time information, the method comprising the steps of:
3 providing a timing representation to a media player;
4 implementing a first media player interface for object management and a second media player
5 interface for exchanging timing and synchronization information with a web browser; and
6 issuing commands from the web browser to the media player, the commands being directed to
7 media player operations other than, and in addition to, instantiation of the media player; and
8 notifying the web browser of media player state changes.

1 40. The method of claim 39 wherein the second media player interface includes a playback
2 state and a current playback time passed from the media player to the web browser.

1 41. The method of claim 40 wherein the player and the web browser both maintain the
2 playing state and the current playback time.

1 42. The method of claim 39 wherein the second media player interface includes the host
2 computer time information passed from the browser to the media player.

1 43. The method of claim 39 wherein the media player notifies the player-hosting peer
2 when media is ready for playback.

1 44. The method of claim 39 wherein the media player prepares for destruction upon
2 receiving a deactivate command from the browser.

1 45. The method of claim 39 wherein the media player changes from a first media source to
2 a second media source upon receiving a change media source command from the browser.

1 46. The method of claim 39 wherein the media player notifies the browser of a buffer
2 empty condition when media playback can not continue due to a media delivery problem.

1 47. The method of claim 46 wherein the media player notifies the browser of a buffer full
2 condition when the media delivery problem has been resolved and media playback can continue.

1 48. The method of claim 39 wherein the browser notifies the player that the media
2 playback time is out of sync with time information maintained by the browser.

1 49. The method of claim 44 wherein the browser notifies the player that synchronization
2 has been regained between the media playback time and time information maintained by the browser.

1 50. The method of claim 39 wherein the commands passed from the browser to the player
2 include play, stop, pause, resume, and seek.

1 51. The method of claim 39 wherein the browser passes a seek command to the player to
2 indicate that the player should jump to a specific time offset into media playback.

1 52. The method of claim 39 wherein the other content includes advertising or other
2 commercial content synchronized with at least one portion of the media content.

1 53. The method of claim 39 wherein the media player is external to the browser.

1 54. The method of claim 39 wherein the step of providing a timing representation to a
2 media player further comprises the step of implementing an interface to provide access to timing
3 information from the web browser.